

DATA EVALUATION RECORD

STUDY 5

CHEM 128976

UNICONAZOLE

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BRANCH EAB

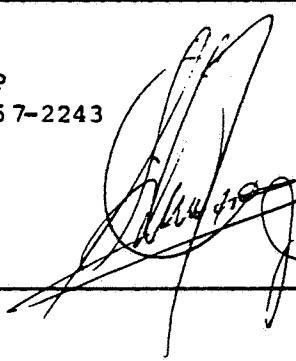
FORMULATION OO-Radiolabeled Active Ingredient

- a. EPA MRID No. 40345430. Yoshimura, J., Nambu, K., Mikami, N., Matsuma, T., and Miyamoto, J. 1986. Leaching behavior of S-3307D in soil. Performed by Sumitomo Chemical Company, Hyogo, Japan. Laboratory Project Identification IIM-60-0008. Completed December 10, 1986. Submitted by Chevron Chemical Company, Richmond, CA.
- b. EPA MRID No. 40573602. Crisp, C.E. 1988. Comparison of two Japanese soil types to typical U.S. soils. Reply to the EPA's comments of the reports entitled: 1. Degradation of S-3307D in soils under aerobic upland conditions; 2. Adsorption and desorption of S-3307D in water-soil suspension systems; 3. Leaching behavior of S-3307D in soil. Performed and submitted by Chevron Chemical Company, Richmond, CA. Completed March 25, 1988.
- c. EPA MRID No. 40728501. Yoshimura et al. 1988. Leaching Behavior of S-3307 in soil (Revised Report). Performed by Sumitomo Chemical Company, Hyogo, Japan. Laboratory Project Identification II M-80-0015. Completed April 28, 1988. Submitted by Chevron Chemical Company, Richmond, CA.

REVIEWED BY: S.C. Termes
EFGWB/EFED/OPP
TEL: (703) 557-2243

TITLE: Chemist

SIGNATURE:

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CONCLUSIONS:

The deficiencies noted in the original study (MRID No. 40345430) were satisfactorily addressed in Studies b and c (MRID Nos. 40573602 and 40728501, respectively). Therefore, data requirements for mobility in soil studies (column leaching, unaged/aged pesticide) can be considered satisfied.

Unaged and aged radioactivity leached readily from a sand column (0.1% organic matter), with 90.7 and 72% of applied radioactivity found in the leachates of unaged and aged soils, respectively. The radioactivity was primarily associated with parent (S)-E-isomer (with traces of the (S)-Z-isomer). The remaining radioactivity was also extracted from soil as parent (S)-E-isomer. Bound ¹⁴C-residues were 2.4% of the applied.

Less than 0.9% of the applied leached through unaged or aged sandy loam soils. However, a downward movement of parent (S)-E-isomer to the 0-5 cm zone was noted with the soils containing 3.2 and 2.1% organic matter (20.3 and 34.2% of the applied, respectively, for aged soil and 29.4 and 60.2% respectively, for unaged soil). For the soil containing 10.2% organic matter, downward movement to the 0-5 cm region was less than 10% (88% of the applied remained with aged soil; 85% with unaged soil). Bound residues were higher with aged soils.

- a. EPA MRID No. 40345430. Yoshimura, J., Nambu, K., Mikami, N., Matsuma, T., and Miyamoto, J. 1986. Leaching behavior of S-3307D in soil. Performed by Sumitomo Chemical Company, Hyogo, Japan. Laboratory Project Identification IIM-60-0008. Completed December 10, 1986. Submitted by Chevron Chemical Company, Richmond, CA.

MATERIALS AND METHODS

Test materials: [phenyl-¹⁴C]-(S)-E-isomer, specific activity 74.6 mCi/mmol, 99.6% radiochemical purity, 98.9% optical purity.
[trz-¹⁴C]-(S)-E-isomer, specific activity 48.9 mCi/mmol, >99% radiochemical purity, 99.4% optical purity.

Soils: Four types of Japanese soils (one of them the Kuki loam soil used in the aerobic soil metabolism study). Table I shows the properties of these soils. The soils were air-dried and sieved through a 2-mm mesh prior to use.

Preparation of soils: 101-196 (air-dry weight) were treated with either the [phenyl-¹⁴C]- or the [trz-¹⁴C]-(S)-E-isomer at a rate of 0.5 ppm and mixed well. The treated soil was placed onto the column immediately or after 4-week aerobic incubation at 25±2 °C in the dark.

Elution: 350 mL of water, at a rate of 2 mL/h, were applied onto the top of the soil columns (with an automatic dispenser). During percolation, the columns were kept at 25±2 °C in the dark. A 0.05 M NaOH was used to trap any ¹⁴CO₂ or other radiocarbon material from the effluxed air (Figure 1). Eluates were collected in a modified fraction collector for examination. After the column was drained off, the soil was pushed out and divided transversely into six fractions (treated soil; 0-5, 5-10, 10-15, 15-20, 20-25 cm downward).

Analyses: Aliquots of the eluates were radioassayed by LSC. Those aliquots containing large amounts of radiocarbon were extracted with a three-fold volume of ethyl acetate at pH 1. The aqueous fraction separated in the extraction was returned to the soil residues and then reextracted as before. The combined organic phase was washed with NaCl (aqueous solution), dried over Na₂SO₄, concentrated to dryness, and subsequently analyzed (LSC and TLC).

Soil fractions were dried, combusted, and analyzed by LSC. Those fractions containing large amounts of radioactivity were extracted 3 times with 60 mL of methanol (10 min shaking), followed then by centrifugation (5000 rpm, 10 min). The combined extracts were radioassayed, concentrated, and then analyzed by TLC. Unextractable ¹⁴C residues were fractionated into fulvic acid, humic acid, and humin fractions. Each fraction was dried, combusted, and analyzed by LSC.

Reported Results

Tables II and III show the distribution of ^{14}C -activity in column soil fractions, eluates, and traps for unaged and aged soils, respectively. Volatile ^{14}C accounted for <0.6% of the applied radioactivity. Unaged and incubated soils from Ushku, Kuki, and Kinomoto produced eluates containing <1% of the applied radioactivity and were not examined further. But the eluates from the Muko sand (0.1% organic matter) contained high percentages of radioactivity (72.0% for aged soil and 90.7% for unaged soil). Analysis by TLC showed that the eluate contained unchanged E-isomer and some traces of the Z-isomer (Table IV).

Some downward mobility was observed for the Kuki and Kinomoto soils (0-5 cm fraction), but in the Ushiku soil most of the radioactivity was retained in the treated soil section. Analysis (TLC) of the treated and some of the 0-5 cm downward fractions showed unchanged E-isomer and traces of the Z-isomer in the extracts. Unextractable, bound ^{14}C was mainly associated with the fulvic acid and the humin fractions. Results are summarized in Tables V and VI.

The authors concluded that the (S)-E-isomer is unlikely to leach in agricultural soils, but that it could be readily eluted from soils with little organic matter content.

Reviewer's comments

This study may be acceptable if the registrant can clearly and convincingly demonstrate that the Japanese soils used are equivalent to soils from the United States. Also, TLC data is referred to as "E-isomers" (or "Z-isomers") Rf values, but it is not clearly explained if that refers exclusively or not to the (S)-E-isomer. Unlike the previous studies which used HPLC to identify degradation products, only TLC was used in the leaching studies. Therefore, the registrant must clarify how it was concluded that it was the (S)-E-isomer the one predominantly present in leachates from the Muko sand and in the treated-soil layer/0-5 cm fractions of the other soils.